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## ABSTRACT

Methodology from an ongoing research study to validate teaching techniques for deaf and blind students provides an example of the ways that several types of quantitative and qualitative data can be combined in analysis. Four teacher and student pairs were selected. The students were between 14 and 21 years old, had both auditory and visual impairments, and were mainstreamed. The teachers, who had no formal training and little experience in teaching the deaf-blind, attended an inservice training session. Quantitative information pertaining to job satisfaction, occupational interests, psychological types, teaching styles, and self-efficacy was obtained before and after training through several psychological instruments; and videotapes of teacher-student interactions provided time-series quantitative information. Qualitative information included demographic information, weekly teacher diaries, and teacher response data. Data are being analyzed by focusing on the individual teacher-student pairs. Quantitative, time-series, and participant response data are treated in a qualitative manner, with each case considered unique. All findings are being interpreted with an emphasis on the context, and the overall emphasis is on inductive analysis and a holistic perspective. Two tables and three figures illustrate findings for one teacher-student pair. There are five references. (SLD)

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## Combining Qualitative and Quantitative Data:

### An Example

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## **Combining Qualitative and Quantitative Data: An Example**

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### **Introduction**

#### **A Brief Overview of Qualitative Research**

Qualitative research is defined as "...any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (Strauss & Corbin, 1990). In the field of education, qualitative research has been defined as "aexperimental," and naturalistic inquiry (known as the naturalistic paradigm) (Tesch, 1990). It requires requisite skills like: the ability to objectively and critically analyze situations, recognize and avoid bias, obtain valid and reliable data, and think abstractly. Combined with these attributes, the qualitative researcher also needs to have an awareness of the theoretical and social context of the study. These aims/requisites do not seem very different from those for quantitative research. However, there are certain themes to qualitative research that may distinguish it from quantitative research. These themes, as described by Patton (1990) are: naturalistic inquiry, inductive analysis, holistic perspective, qualitative data, personal contact and insight, dynamic systems, unique case orientation, context sensitivity, empathic neutrality, and design flexibility.

Selection of qualitative methodology in conducting research may depend on the nature of the problem (e.g., analysis of the conversation between the client and the counselor), the conviction of the researcher, a need for intricate detail in data, or a need to develop a new outlook toward established theories (Strauss & Corbin, 1990). On the other hand, quantitative methodology may be selected on the basis of the need to obtain data that help test predetermined hypotheses using psychometrically sound principles. It is the position of the authors that invariably, social scientists use both qualitative and quantitative methodologies in designing and conducting research. Selection of a logical-positivist-deductive paradigm over a phenomenological-inductive paradigm is, at times, not required or recommended. Both approaches can be adapted to complement each other in realizing the aim(s) of a research study. If a choice does have to be made, it should be on the basis of methodological appropriateness over methodological orthodoxy (Patton, 1990).

A research study was conducted to validate teaching techniques (provided in inservice training sessions) for students who are deaf-blind. This symposium uses the methodology from this study as an example of the ways that several types of quantitative and qualitative data can be combined in analysis. In the following sections, this research study will be described on the basis of characteristics of qualitative research as outlined by Patton (1990).

Validation of Teaching Techniques with Students who are Deaf-Blind

Teacher-student pairs were selected from four states in the U.S. to participate in a study over the course of an academic year (September '90 to May '91). Subjects met the following criteria: (a) the teacher had no formal training in the area of deaf-blindness, and less than two years' experience with a student who is deaf-blind; (b) the students were between the ages of 14 and 21, with both auditory and visual impairment; and (c) the student must be "mainstreamed" to some extent defined here as being in a classroom with students who were not deaf-blind. Participating teachers attended two, two-and-half day inservice training sessions provided by recognized experts in the field of deaf-blindness. An array of topics pertaining to deaf-blindness was discussed, with particular emphasis on communication strategies for individuals who are deaf-blind and planning for transition from school to employment. Individual sessions between the inservice staff and teachers were arranged to discuss the instructional goals for each student. During this time, specific strategies for teaching and communicating with the student were suggested by the inservice staff.

Quantitative information pertaining to job satisfaction, occupational interests, psychological types, teaching styles, and level of self-efficacy was obtained from teachers which provided scores to compare before and after training. Teachers were also asked to complete a checklist of the tasks that could be performed by the student before and after the research intervention.

Interactions between each teacher-student pair were videotaped in the classroom on six different occasions, providing time-series data on the modes of

interaction, type of interaction, frequency and duration of interaction, frequency of student-initiated versus teacher-initiated interactions, and the appropriateness of responses to attempts at communications. Samples of the videotaped interactions were coded using the Communication Observation Schedule (Tedder & Sikka, 1990). Three raters, all familiar with deaf-blind students, first coded the videotaped interactions independently, then reached a group consensus on any areas of disagreement.

Qualitative data included demographic information on the teachers and students participating in the study. Teachers also maintained a weekly diary of their experiences during the course of the research project to provide a context to the quantitative data previously mentioned. Important information was also obtained from the inservice evaluations that included teachers' responses in the areas of content, media, expertise of inservice staff, and usefulness of materials provided during the inservice training sessions. This type of information, which we have termed "participant response data," was directly supplied by the subject, rather than by standardized test results or behavioral measures.

Delineation of variables. The pretest-posttest information and time-series data are, essentially, quantitative in nature, whereas the participant response data (teacher diaries, portions of the inservice evaluations, portions of communication questionnaires, and personal communications) and demographics are largely qualitative. These data could have been analyzed with primarily quantitative methodology; however, the researchers adopted a qualitative perspective because: (a) the combined effects and varying nature of visual and auditory impairment in an

individual often cause an array of strengths and needs that are very unique to each individual; (b) the nature of the inquiry recommended rich description of interactions within a context; and (c) there is a dearth of information on the effectiveness of inservice training on the teachers and students in the area of deaf-blindness.

Researchers were interested in within-subject variability, within the context of each teacher-student pair. Moreover, communication between teachers and their students who are deaf-blind was an important aspect of the study, requiring in-depth observation of interactions between each individual teacher and student. The need to triangulate data led to the incorporation of quantitative data within the larger description (qualitative) scheme.

Analysis strategies. One of the themes of qualitative research identified by Patton (1990) is *empathic neutrality*. As defined by the author, this is the ability to "include(s) personal experience and empathic insight as part of the relevant data, while taking a neutral, non-judgmental stance toward whatever content may emerge" (pp. 41). Additionally, Patton (1990) acknowledges that there are few universal canons for qualitative data analysis, making each qualitative study unique. This underscores the need to report, in detail, the process of data analyses.

In the study described here, it was decided that data would be analyzed best by focusing on the individual case. A file for each teacher-student pair was compiled, consisting of descriptive information (teacher and student demographics, a content analysis of the teacher's diary, the inservice evaluation form, and the communication questionnaire); pretest-posttest data on measures of job satisfaction, occupational

interests, psychological types, instructional styles, and self-efficacy; and time series data on observation of the communication between the teacher and student over six occasions (two before first inservice, two between first and second inservice, and two after the second inservice session).

The first step in analysis, checking the data for completeness, started during the data collection phase and continued during the post-data collection phase. Follow-up phone calls were made to verify information. While checking the data for completeness, the researchers decided to obtain demographic information about the student from the teacher, to determine if the teacher had become more knowledgeable about her student during the course of the research study.

The second step involved examining and re-examining the data, and deciding upon a strategy for analysis. Any possible connections between data from different sources were explored. On the basis of this information, the format for data presentation was decided. This stage also involved summarizing demographic information about each teacher-student pair, sharing information acquired as a result of personal contact with the teachers, conducting a content analysis of the diaries, summarizing inservice evaluations, scoring and summarizing pretest and posttest data obtained from tests, functional checklists, and presenting data from the Communication Observation Questionnaire in a figural form (figures, pie charts, etc.).

It is anticipated that the third step will include developing case files on each teacher-student pair, examining these files individually and in a team, noting and summarizing the input of each team member, and carefully documenting patterns and

themes in the data. It is likely that questions of interpretation will arise as a result of these discussions, and follow-up telephone interviews with the teachers will be conducted, if required.

The fourth step is to explore the possibility of a common trend in data (e.g., change in communication modes used by teachers as a whole) by comparing patterns and themes emerging from each case with others. During the third and fourth stage of data analysis, the researchers will constantly question and share each others' conclusions, and try to validate notable changes in data from one source with information from another source (e.g., a substantial positive change in the teacher's feelings of self-efficacy may be accompanied by reported job satisfaction, and increase in the number of teacher-initiated interactions with her student who is deaf-blind).

In other words, the researchers anticipate continuing to triangulate data. Triangulating data involves relating different sorts of data in such a way that possible threats to the validity of qualitative analysis are counteracted (N. Fielding & J. Fielding, 1986). In this research, validity and reliability of data will be established with the help of investigator triangulation (validating results or conclusions by using more than one investigator), and data triangulation (validating results by using data from various sources).

### Participant Responses As Qualitative Data

Participant responses are one type of qualitative data that can be used creatively to add to the researcher's knowledge about the subjects during the study

period, how they are affected by the research process itself, and how their teaching techniques, relationship with their students, and self-confidence have been affected by the experimental intervention. In addition, participant responses can point out possible problems or limitations of the quantitative data collection process. This research project provided participant response data from four sources: teacher diaries, training evaluations, communication questionnaires, and personal communications.

#### Teacher Diaries

Participating teachers were requested to keep diaries about their student, including descriptions of the success or failure of new communication techniques, daily activities, notes on their state of mind, outside events affecting the student's performance (e.g. changes at home or illness), or anything else that the teacher wished to include.

### Training Evaluations

After the second of the two inservice sessions, teachers were asked to complete an evaluation form covering the content, materials, format and media of the two training sessions. They were also asked to describe their impressions of the expertise of the trainers, the length of the training sessions, the importance of meeting other teachers of students with dual-sensory impairments, and an overall rating of the two inservice sessions.

### Communication Questionnaires

Teachers were asked to complete a questionnaire prior to the first inservice training session, describing the extent to which they use specific communication modes (i.e. physical, voice, sign language, gesture, and communication with books, objects, or adapted equipment). In addition, they rated their own training and ability to communicate with students who are deaf and blind.

### Personal Communication

The researchers took pains to keep in touch with the teachers throughout the study period. Two visits were made to each school, during which project staff collected videotaped data (the four other videotapes used in the project were filmed by school staff). In addition, regular telephone contact was maintained. Teachers were aware that they were welcome to call or write with any questions or concerns about their role in the project, or with any news they wished to share about their student.

### Uses of Participant Response Data

Participant response data have been used for four purposes. The first purpose

is to cross-check with quantitative data. The COS provides just a "snapshot" of teacher interaction. The researchers were interested in how the teacher and student interacted over an extended period of time, as well as in the individual time segments coded with the COS. Discrepancies between participant response data and the quantitative instruments (the COS and the various psychological tests that were administered) could mean that the COS data is not "telling the whole story."

For instance, one teacher-student pair ("Laura" and "Kevin") show the lowest frequency of teacher-initiated interactions in the study. Without participant responses to provide context for the time-series data, an observer might suspect that the two were experiencing difficulty communicating. But through personal communication (staff site visits) and Laura's diary it becomes apparent that the opposite is true; Kevin, in fact, communicates at a higher level than the other students in the study. The low frequency of interactions on the COS occurs because Kevin was videotaped working independently with adaptive computer equipment. His teacher, Laura interacts only when necessary, because Kevin has expressed a preference for working by himself whenever possible.

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\* Names have been changed to protect confidentiality

The second purpose for which participant responses are used is to measure the "real life" usefulness of the intervention. The inservice training sessions were designed by expert trainers in the fields of blindness and deafness to provide important information on best practices to teachers with very little or no experience in teaching children with dual-sensory impairments. Participant response data were examined for confirmation that teachers were able to use the material presented in the inservice training sessions.

Teacher diaries demonstrate the success of implementing certain techniques learned in the training session, and the failure of the attempted implementation of others. The videotaped segments coded with the COS did not provide information relating to these implementations because they pertained to activities not related to these techniques. Without the participant response data, researchers would be unaware of the extent to which techniques suggested at the inservice training sessions had been implemented. One teacher ("Joanne"), for instance, writes about her progress in setting up and using a "calendar box", a system to describe a student's day by using symbols to represent activities. A symbol is presented to the student when it is time to begin an activity, and put into a "finished" box when the activity is completed. Symbol/calendar boxes aid in establishing and maintaining a routine, and can also be used to help choose a preferred activity.

On December 4, immediately after the first intervention, Joanne writes "We started working on his new communication device today." On December 19, she notes that "[Richard] is responding well with the object communication system. He seems

to be tuned-in to what is going on. I expect much success. Presently, he is touching the object with a slight grasp." On the 22nd of December, she continues:

"Communication system [schedule boxes] is going fine. I'm impressed with Richard's success and change in attitude. He seems to look more alert and anticipates his daily routine."

Richard's new skill was retained through the 2-week Christmas break. On January third, Joanne writes "He continues to anticipate his activity via the schedule box system." Later in January, she notes "Richard's communication system is working great...shared communication system with Richard's mom and she seems very pleased. She would like to see it be refined." Joanne then looks for a way to refine the system further and personalize it for Richard's needs; on January 31, she writes "I wonder if I should put a general [going out] symbol in the box, maybe, he'll enjoy his trips more." In early March, it appears that Richard is ready to move on to something new. Joanne mentions that "He seems to be growing bored with the program."

Another teacher, "Janet," set the goal of teaching her student "Larry" to sign "eat." On December 4 she writes, "We began a goal for signing eat because we felt if his hands are around his mouth maybe we could make it a functional, useful activity for Larry." Later that month, Janet expressed disappointment with Larry's progress: "Since we've started this goal, we've not had much success. In setting this goal, at this stage it's a matter of Larry allowing us to move his hands. It's usually a matter of whether he is willing to cooperate. Today he was willing to allow me to move his hands in signing eat but he wasn't interested in the food so it really had no purpose."

As of the last diary entry written on this subject, Larry had still not made progress toward this goal. On March 5, Janet writes: "Today we're working on signing 'eat.' Larry would not cooperate at all. He wouldn't let me move his hand and he would turn his head away from the food." The inservice training sessions did not succeed in providing Janet with a skill she could use to help her student meet this particular goal.

The Inservice Training Evaluation was also used to help measure the utility of the inservice content. Administered after the second training session, one open-ended question proved particularly valuable. It read, "Describe, as a result of this training, what changes you have made with your particular [videotaped] deaf-blind student?" In several cases, respondents mentioned that they had changed their areas of emphasis in instruction. One teacher wrote, "Less emphasis on communication skills he does not currently need, i.e. sign language/fingerspelling. More emphasis on teaching/developing leisure skills. Evolve toward a more family/friend/community-based approach to transitional planning." Another teacher noted that, because of information gained during the inservice session, she is having her student evaluated for a foot-propelled wheelchair. Increased implementation of choicemaking and exploration activities were also mentioned by several respondents. In combination with the teacher diaries, the inservice evaluations provide a glimpse into how life changed because of the inservice training for the students who are deaf-blind, and how these changes came about.

The fourth and final purpose for which participant response data were used is to gain information on attitudinal/motivational status of the teachers. Diaries and

communication questionnaires were used in conjunction with a measure of job satisfaction, the Minnesota Satisfaction Questionnaire (MSQ), to examine how behavior, attitude, self-rating of communication ability, and job satisfaction intersect. The teachers scoring most and least satisfied on the MSQ best demonstrate participant response data may be used in this way.

Janet, the teacher who scored lowest in job satisfaction (during both administrations of the MSQ), rated herself lower than any of the other teachers on the communication questionnaire item reading "How would you rate your general ability to communicate with deaf-blind students?" ("Fair," on a scale of "Very Competent," "Adequate," "Fair," and "Poor"). In addition, her diary entries show a pattern of discouragement with her efforts to work with her student Larry. In December, for instance, she writes, "He may or may not respond. Most everything Larry does is inconsistent. Today, I get no responses." Her inability to find a reinforcer for Larry is a continuing source of frustration for Janet. A typical diary entry, again from December, reads "Larry allowed me to place his hand on the switch but showed no interest in the music. Sometimes it's like he falls asleep in the middle of an activity...This is frustrating when working with him because he is like that through almost any seat activity." Janet does note a certain amount of success with improving Larry's gross motor activities, but overall, her diary entries show more discouragement than enthusiasm. She does not mention the inservice training sessions, nor is there evidence of her implementing techniques learned there; it would appear that participating in the project has not been a particularly useful experience for her.

"Sue," in contrast, scored highest in job satisfaction on the MSQ, and also was the only teacher to rate herself as "very competent" in communicating with students who are deaf and blind. Even after an attempt at implementing a schedule box system for her student "David" failed (it was destroyed by other students in the classroom), Sue continues to try new techniques learned during the inservice sessions, congratulates herself on David's successes, and attributes this success partially to the training that she received through this project. She writes in January, "I realize without that [the inservice] David could not have been on my brain so much and the ideas I have for him wouldn't be there." Sue appears to have been highly motivated by the inservice sessions. After the first training session she writes "I got a ton of great ideas to try with David. I also feel affirmed for what's been happening so far. Training session was fantastic. I feel so fired up to be teaching. Looking forward to trying new ideas." She expresses a desire to share what she has learned with other teachers in her school.

### Quantitative Data

In order to determine the effects of inservice training on the teachers' ability to utilize and implement this training in the classroom, pretest-posttest data with several instruments were obtained. These instruments were: the Minnesota Importance Questionnaire, the Minnesota Satisfaction Questionnaire, the Myers-Briggs Type Indicator, and the Canfield Instructional Styles Inventory. A short description of each test follows.

#### Minnesota Importance Questionnaire (MIQ)

This test provides a measure of vocational needs, and may be used in vocational counseling, career planning, and job placement. It is designed to measure the importance given by the respondent to twenty psychological needs, which are subsumed under six underlying values that have been found to be relevant to work adjustment. These six values are: Achievement, Comfort, Status, Altruism, Safety, and Autonomy. This test yields need scores for each scale ranging from -4.0 to 4.0 (with a mid-point of 0.0). The MIQ report also lists ninety representative occupations grouped into six clusters. These clusters designate groups of occupations with similar Occupational Reinforcer Patterns (ORP). The respondent is identified as S (satisfied), L (likely satisfied), or N (not satisfied) for each of these 90 occupations.

#### Minnesota Satisfaction Questionnaire (MSQ)

This test provides a measure of a primary indication of work adjustment, job satisfaction. The test yields a measure of the respondents satisfaction in twenty areas: Ability Utilization, Achievement, Activity, Advancement, Authority, Company Policies

and Practices, Compensation, Co-Workers, Creativity, Independence, Moral Values, Recognition, Responsibility, Security, Social Service, Social Status, Supervision-Human Relations, Supervision-Technical, Variety, Working Conditions, and General Satisfaction (note: these areas are comparable with the needs outlined in the Minnesota Importance Questionnaire).

#### Canfield Instructional Styles Inventory

The Canfield is designed to be used by instructors in educational and business settings to identify the conditions under which they teach best. This test uses a forced-choice ranking procedure to assess relative preferences for 21 different aspects of the teaching-learning experience, which are divided into four categories: Conditions for Instruction (peer, organization, goal-setting, competition, instructor, detail, independence, authority); Areas of Interest (numeric, qualitative, inanimate, people); Modes of Instruction (lecturing, reading, iconic, direct experience, and influence), and Influence (social, independent, applied, conceptual, and neutral). The test helps classify teachers into any of the above categories, or any resulting mixed types (e.g., social/applied, social/conceptual, independent/applied).

#### Myers-Briggs Type Indicator

This test helps classify individuals into psychological types (as established by Jung) on the basis of various combinations of the following polarities: introverted-extraverted, sensing-intuitive, feeling-thinking, and perceiving-judging. The preference of one aspect over the other is evidenced by a higher score in that category. However, any interpretations should be based on the magnitude of the difference between the

two polarities, and take into account that these are measures of preference and are sensitive to changes in the person's life and environment.

#### Teacher Self-report

This instrument was constructed by the researchers and consisted of three questions, requiring the teacher to rate herself on a scale of 1 to 10. These questions were: (a) In general, how comfortable do you feel with the student? (1=uncomfortable to 10=very comfortable); (b) How well do you like the student? (1=not very much to 10=very much); and (c) How effective do you consider yourself as this student's teacher? (1=not effective to 10=very effective).

#### Using Quantitative Data

To demonstrate the process of utilizing quantitative data to validate conclusions from qualitative data, the scores of one teacher (i.e., "Sue") are presented. Table 1 presents data on this teacher's pre- and posttest scores on the various subscales (reinforcers) of the Minnesota Satisfaction Questionnaire.

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Insert Table 1 here

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Using elementary teachers as a norm, standard scores were derived for the Minnesota Importance Questionnaire subscales for Teacher 1 (Table 2). For the purpose of interpretation, it is assumed that any need with a standard score of more than  $\pm 1$  is considered important by the teacher. Also, a difference of  $\pm 1$  between pretest and posttest scores will be considered to be important.

Teacher 1 showed negligible change in her instructional styles and her type indicator. However, when her self-ratings were taken into account, Teacher 1 showed a considerable increase in her level of comfort with the student (from 4 to 9), liking for the student (from 5 to 9), and effectiveness as the student's teacher (from 5 to 7).

### Time-series Data

#### Communication Observation Schedule

Interactions between the teacher and student in the classroom were videotaped over six occasions (two before the first inservice, two between the first and second inservice, and two after the second inservice). Videotaping was chosen over participant observation because of: (a) lack of funding for six visits to each school; (b) unavailability of individuals in each school who could be trained to rate behavior; and (c) difficulty of rating behavior accurately while interaction was taking place. Videotaped interactions in the classroom were also used during the inservice training session for teachers for individualized instruction and as a group teaching technique.

A 10-minute time period was videotaped for each of the six data collection occasions. Three, one-minute segments were selected (at random) from each 10-minute videotaped period. Three raters familiar with the field of deaf-blindness coded interactions occurring within the randomly-selected time period using the Communication Observation Schedule (COS) (see Appendix A). The raters coded each interaction on individual forms, then came to a consensus on any point of disagreement through group discussion.

The COS focuses on several important aspects of interaction: duration, frequency, type (instruction, social, praise, etc.), communication mode used, initiator (teacher or student), and appropriateness of response to attempts at initiating an interaction.

#### Using Time-Series Data

Frequencies were counted for each of the above mentioned categories, over each occasion. Figure 1 represents the number of appropriate and inappropriate responses made by the student and teacher over 6 occasions of videotaping.

Figure 2 and 3 present the frequency of different communication modes used by the sample student and teacher (respectively) to initiate interactions.

It may be noted that Sue showed an increase in her appropriate behavior during the occasion after the second intervention training (Figure 1). Corresponding to that, use of voice and physical modes of communication also increased. These changes could be further substantiated by watching the respective segment (in this case, the second occasion) of videotaped interaction, to note whether these

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Insert Figure 1 here

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Insert Figure 2 and 3 here

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changes in the teacher's behavior were apparent over the entire 10-minute segment.

Also, notes made during the first and second inservice session revealed that the inservice staff had debated the possibility of David being able to hear. The inservice staff suspected that he could hear certain sounds and that this ability had not been identified in any auditory assessment because the student did not communicate well and functioned at a low intellectual level. The change in the frequency of communication modes (e.g. physical) could also be explained by the fact that a major emphasis in the inservice sessions was utilization of appropriate communication modes and the need to give students who are deaf-blind a choice between activities (e.g., choosing between computer activity and listening to music). Physical touch is a very effective means of communicating (especially initiating) with an individual who is deaf-blind. It should be noted that the frequency of teacher-initiated interactions gradually increased, only to drop off in the final stage of the research project. A careful examination of the diary narrative may help shed light on possible reasons for this decline.

An examination of Table 1 will show that Sue's overall Job Satisfaction increased, with the highest gain in Creativity, followed by Company Policies and Practices, and then Advancement. Thus, this teacher felt that she was able to use her creativity to a larger extent during the course of the academic year. This data is substantiated by the enthusiastic comments in her weekly diary. On the MIQ, Sue increased in her need for Compensation and Activity (Table 2). However, this was not accompanied by any decrease in her job satisfaction in these areas.

### Conclusion

These are a few basic examples of the strategy that will be adopted in analyzing data by combining qualitative and quantitative information. When each case is considered as a whole, it is very likely that data will become very cumbersome and will justify the need for input from several analysts, hence ensuring objectivity and reducing the likelihood of overlooking a crucial aspect of the data (investigator triangulation). However, the depth of the information obtained on each teacher-student pair will identify some potential instructional strategies that work with teachers of students who are deaf-blind. Also, it is anticipated that this in-depth analysis of data will point towards further directions for conducting research to improve the quality of life of individuals who are deaf and blind.

In conclusion, this study incorporates some of the major themes of qualitative inquiry as outlined by Patton (1990). Specifically, quantitative, time-series, and participant response data are treated in a qualitative manner, each case is considered to be unique, the researchers have maintained personal contact with the teachers and student by visiting the classroom setting and through telephone conversations, all findings will be interpreted with an emphasis on the context (e.g., illness, change of supervisors), the emphasis is on inductive analysis and a holistic perspective, and above all, the research design was revised as and when the need arose for more or different information (design flexibility).

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**Table 1**  
**Minnesota Satisfaction Questionnaire Scores (Teacher 1)**

| Reinforcer                         | Pretest | Posttest |
|------------------------------------|---------|----------|
| Ability Utilization                | 22      | 20       |
| Achievement                        | 21      | 19       |
| Activity*                          | 24      | 25       |
| Advancement*                       | 15      | 19       |
| Authority*                         | 25      | 25       |
| Company Policies<br>and Practices* | 16      | 19       |
| Compensation*                      | 18      | 18       |
| Co-Workers*                        | 23      | 24       |
| Creativity*                        | 23      | 25       |
| Independence                       | 16      | 20       |
| Moral Values*                      | 25      | 25       |
| Recognition*                       | 21      | 20       |
| Responsibility                     | 25      | 24       |
| Security                           | 19      | 21       |
| Social Service*                    | 25      | 25       |
| Social Status                      | 15      | 18       |
| Supervision-Human<br>Relations     | 21      | 20       |
| Supervision-Technical              | 19      | 20       |
| Variety                            | 20      | 22       |
| Working Conditions                 | 20      | 17       |
| GENERAL SATISFACTION*              | 84      | 88       |

\* scales judged to be reliable (Hoyt reliability = .90 or more)

**Table 2**  
**Minnesota Importance Questionnaire standard Scores (Teacher 1)**

| Subscale                          | Pretest | Posttest |
|-----------------------------------|---------|----------|
| Ability Utilization               | 1.4     | 1.9      |
| Achievement                       | 1.9     | 2.2      |
| Activity                          | 0.5     | 1.5      |
| Advancement                       | 0.2     | 0.2      |
| Authority                         | 0.9     | 1.2      |
| Company Policies<br>and Practices | -0.1    | 0.5      |
| Compensation                      | 0.8     | 1.7      |
| Co-Workers                        | 0.1     | 0.6      |
| Creativity                        | 1.4     | 1.9      |
| Independence                      | -1.6    | -1.3     |
| Moral Values                      | 2.4     | 1.1      |
| Recognition                       | -0.4    | -0.1     |
| Responsibility                    | 1.4     | 1.5      |
| Security                          | -0.3    | 0.6      |
| Social Service                    | 1.4     | 1.7      |
| Social Status                     | -0.8    | -0.8     |
| Supervision-Human<br>Relations    | -0.4    | 0.2      |
| Supervision-Technical             | 0.6     | 1.0      |
| Variety                           | 0.6     | -0.3     |
| Working Conditions                | 0.6     | 0.6      |
| Autonomy                          | 0.5     | 1.2      |
| GENERAL SATISFACTION              | 84      | 88       |

Figure 1.  
 APPROPRIATE AND INAPPROPRIATE RESPONSES  
 Teacher/Student Pair #1

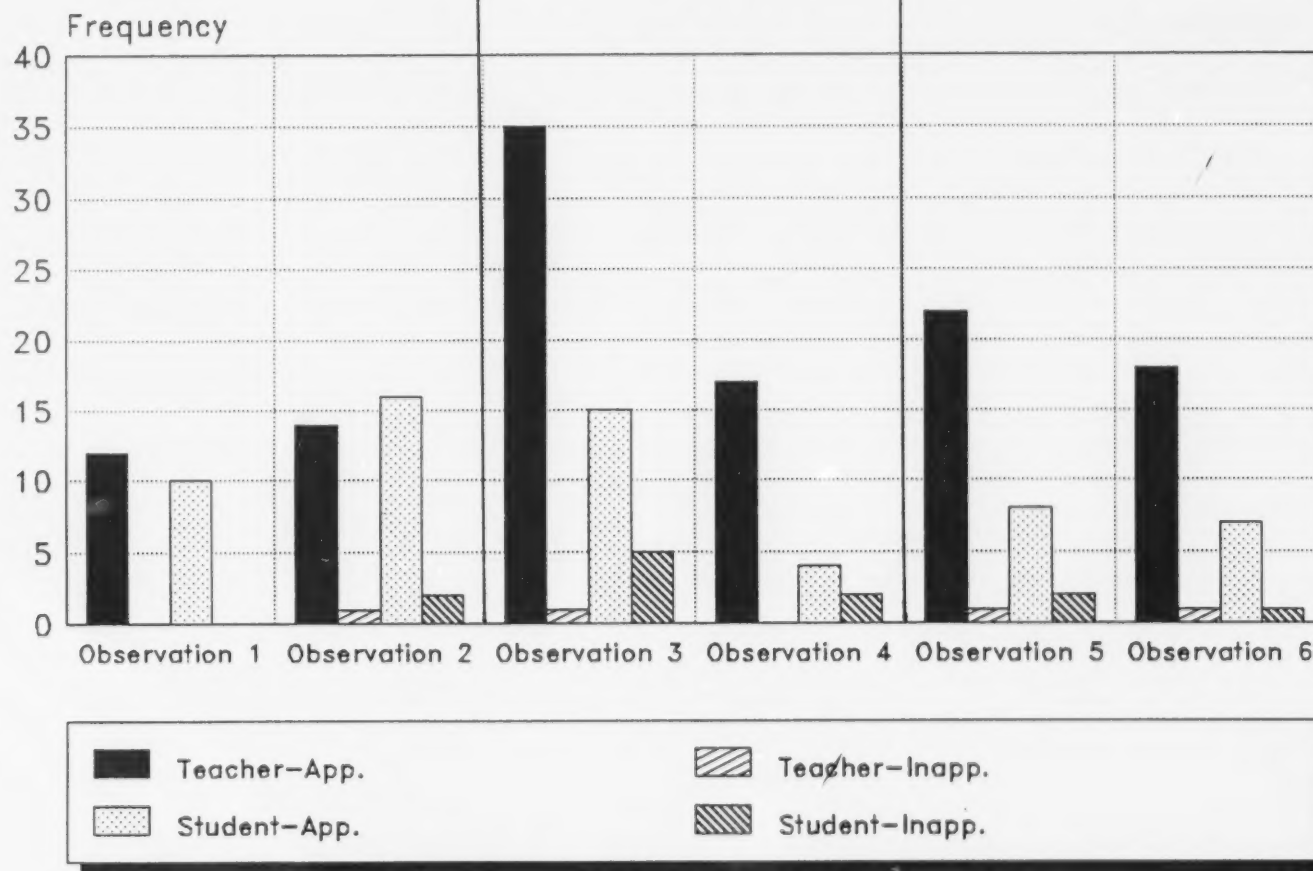


Figure 2.

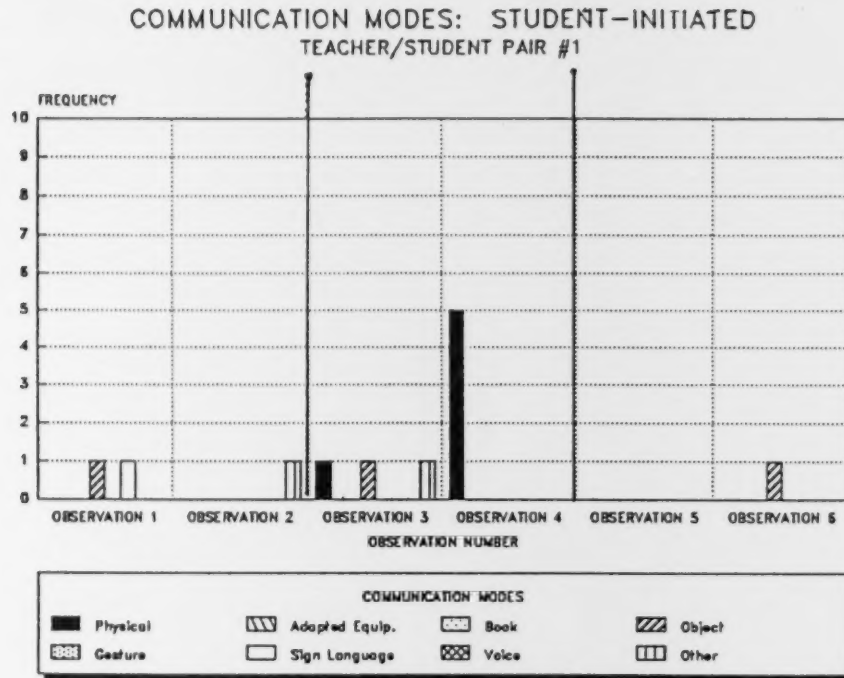


Figure 3.

